REMARKS

OF

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BEFORE THE

HISTORICAL SOCIETY

OF BRADFORD COUNTY,

AT

TOWANDA, PA.

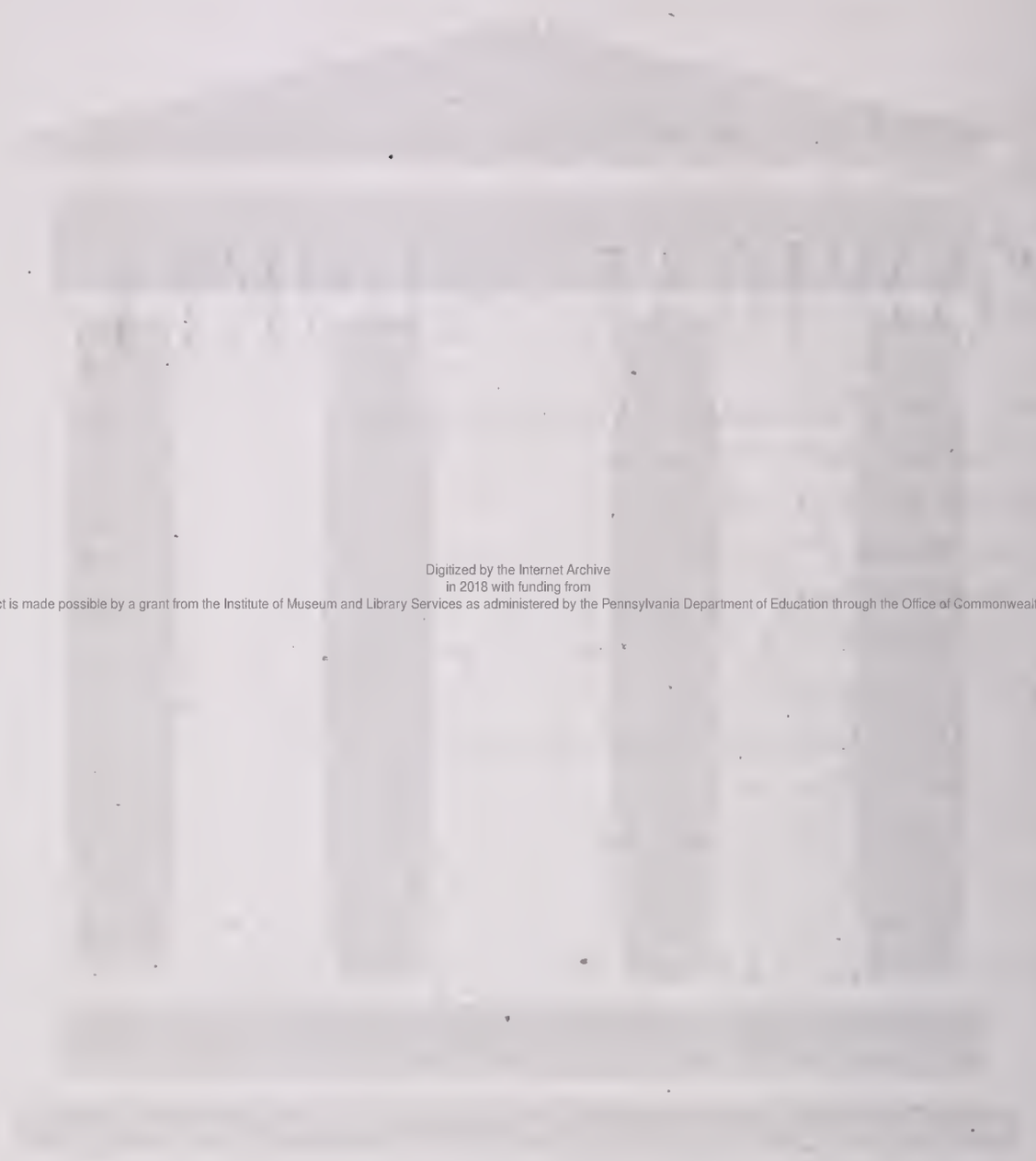
DECEMBER 9, 1872,

ON THE

MAMMOTH AND MASTODON,

AND THE AGE IN WHICH THEY LIVED.

ATHENS PA.:
THE ATHENS GAZETTE.
1879.



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MAMMOTH AND MASTODON,*

AND THE

AGE IN WHICH THEY LIVED.

The tooth that I show you is the right upper molar of the *Elephas Primogenius* or Mammoth. It is one of two teeth lately found in the township of Chemung, Chemung county, and State of New York.

There are several things, relative to this tooth, that invite our attention. The first is its wonderful size when compared with other teeth of the Mammoth. The figures that I show you are from Sir Charles Lyell's Elementary Geology, taken from original specimens, one third of natural size. You will observe that this tooth is a fac simile of the figures represented, but very much larger, from which we may naturally infer that this tooth belonged to a *giant* of *his* own race. I wish you to observe carefully the figures given representing the tooth of the Mammoth and the Mastodon. There is a very marked difference in the appearance of the two teeth. None will fail to say that this specimen is the Mammoth's tooth. The reason why I am so particular in calling your attention to the distinction in the teeth, is, that some naturalists have denied the pre-existence of the Mammoth in America. Thus far, there is little doubt that the most of these large animals found in America have been Mastodons, but this tooth certainly represents the tooth of the Mammoth. So that those holding to the above doctrine must be mistaken.

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* This Essay was first printed in *The Athens Gleaner* of 19th December 1872. It is issued in this form at the request of gentlemen, verbally or in writing, from different parts of the country. The writer is greatly indebted for information in preparing it, to Lyell's Elementary Geology, the American Encyclopedia, and Mitchell's Physical Geography. No further discoveries have been made in the Chemung field, and my professional engagements have not allowed me to add anything to what was compiled six years since. E. P. ALLEN.

This tooth is very heavy. Its weight is nine pounds. From the anterior point to the posterior part of the grinding surface, is nine inches. This surface is slightly concave, amounting to three-fourths of an inch ; it is three and one half inches in breadth, and twenty-eight inches in circumference, and is, I think, the largest tooth of the kind on record. The other tooth, found at the same time and place, is the left upper molar, and is of the same size and weight. These two other specimens are undoubtedly broken from the jaws. This one I think is a portion of the upper jaw, and the other is from the lower jaw. You will observe a couple of the ends of fangs of teeth in this part. They are not heavy bones, being cancillated in their structure, and the animal material mostly decomposed. The question naturally arises, How long a period has passed since the animal died to which these specimens belonged ? We shall have something to say on this subject, further on.

You will, doubtless, be interested to know how and where these specimens were found. Two boys and a man, on the 28th of October, were digging potatoes on the farm owned by Henry Biedleman, a few miles below the Chemung battle field of 1779, and about three miles above the village of Chemung, near the north bank of the Chemung river. As they were about leaving their work they went down rather a steep bank to the river to wash their hands, the dirt, giving way, ran down the bank, exposing what one of the party thought rather a curious looking stone, on examining it, it proved to be a tooth. In an instant, the other boy observed and picked up its mate, lying near it. They soon exhibited them to several men, near by, and all acknowledged them to be very curious specimens. In a short time Dr. E. Gere was passing by, when he was halted, and the teeth displayed. The Doctor at once recognized them to be the teeth of the Mammoth, purchased them of the boys, and visited the location where they were found, to ascertain if he could discover more of the remains. On digging into the bank with a stick, the other bones shown you were dug out. From what the Doctor saw, he believed the head of the Mammoth lay toward the river, and that the remainder of its skeleton lay back under the bank, and was covered ten or twelve feet with dirt. It is the intention of Dr. Gere to dig into the bank, hoping to find the remaining part of the skeleton.

Tusks of the Mammoth have been found, one or two miles below where the teeth were found, that are supposed to have belonged to the same animal. They may have belonged to the same animal or others of the same kind. For it is very likely others lived in the same locality, and they may have been quite numerous, as quite a number of tusks have been found on the Chemung and Susquehanna rivers.

J. B. Wilkinson, in his Annals of Binghamton, says, in corroboration of that which is said to have given rise to the Indian word "Chemung," as appropriated to the river of that name. Judge Baker relates, that a few years after his settlement upon the plain, he was passing up or down the river in a canoe, with one or two others, and at the shore, near what is called "The Second Narrows," when they were about to disembark, there was observed under water something, protruding out of the bank, looking like the root of a tree. It was spoken of as a curious root. Judge Baker requested one of the men to get into the water, examine, and, if possible, to draw it out or break it off. It was soon found to be no root. Their curiosity was increased, and all got into the water to wrest it from the bank in which it was partly embedded. They succeeded in getting it out, and found it to be a perfect, though an immense horn. It measured from one extremity to the other nine feet in the curve, and was six feet measuring in a straight line. It was somewhat corroded by time, though not enough to materially affect either its form or coherency. As not much attention could be paid to curiosities, it was negligently left at a blacksmith's shop for a long time. Judge Baker intended to have it taken care of, and examined, if practicable, by some competent naturalist. It was left at the shop, as nearly as the writer can recollect, to have a band put around where it was split. After a while, the horn was missing. The blacksmith, having an opportunity of disposing of it for a paltry sum, sold it to a pedlar, and it was taken to some of the New England States, and has not been heard of since.

A captain Mc'Dowell, who was taken prisoner by the Indians, and sometime with them, saw pieces of a very large horn, which the Indians said their fathers had found in this river, and therefore gave the name of "Chemung," which signifies Big Horn.

Capt. McDowell, who saw the horn found by Judge Baker, said he had no doubt but the two belonged to the same animal. Of what species that animal was, it belonged to learned naturalists to determine.

A large tusk is reported to have been kept in the Red Jacket Garden, some time since, in Elmira. Its whereabouts, now, can not be traced by the writer.

I have been informed that, during the excavation of the Junction Canal, which extends from the north line of Pennsylvania, in the township of Athens, through the towns of Chemung and Southport, to Elmira, that while the laborers were digging through the flats along the river in Chemung township, what was supposed to be two large tusks were exhumed, at no great distance apart, one of which appeared like chalk, and was easily dug to pieces from its bed. The other tusk adhered together with considerable tenacity, though destroyed by the picks of the workmen.

A part of a tusk of the Mammoth was found in Sheshequin, a few years since, and another in Wyoming county. I do not remember at what place.

Remains of the Mammoth and of the Mastodon have been found in New Jersey, New York, Pennsylvania, Kentucky, Ohio, Illinois, Missouri, Kansas, and other of the United States.

The Mammoth and Elephant species have been found in Great Britain, in Sweden, Norway, but most abundently in the frozen regions of Europe, and Asiatic Russia, about the mouths of rivers, descending into the icy sea. There is, indeed, hardly a river in Siberia in whose bed or on whose bank these remains have not been found, as well as in the neighboring plains, in connection with bones of other animals that are now strangers to the climate; they are not found in the elevated regions.

In Siberia, fossil ivory is so abundant and so well preserved that it gives rise to a considerable traffic both for home and foreign use.

The most remarkable discovery in relation to the Mammoth was the occurrence of a carcass found by a Tungoos fisherman, in a block of ice, on the border of the Arctic sea, in 1799, near the river Lena. In the course of a few years, this immense body of ice was thawed, and in it was found an elephant, having the flesh and soft parts well preserved, with the exception of such por-

tions as had been devoured by bears, dogs, and other carniverous animals; the tusks were very fine, weighing three hundred pounds. In 1806, the skeleton was transported to St. Petersburg, in a very perfect condition, by Mr. Adams, who was traveling for the museum, where it now remains. He ascertained the skin had an abundant covering of hair and wool, indicating that it was fitted to resist a cold climate. From this it is evident that the climate of Siberia, during the diluvial period, was not like that of the regions now inhabited by elephants; it must have been moderately cold, though such as would permit the growth of a vegetation more luxuriant than any in the present arctic regions, and sufficient for the nourishment of those bulky animals.

Another more recently discovered specimen allowed a microscopic examination of the tissues. The skin of the Mammoth or as it is sometimes called elephant, is covered with hair of three kinds, the longest twelve or fifteen inches, is brown and like horse hair; the shorter nine or ten inches, is more delicate, and fawn colored; and the wool at the base of the hair, four or five inches long, is fine, smooth, fawn colored, and a little frizzled at the roots.

The Mammoth has never been found living, nor have any of the existing elephants been discovered in the fossil state. It was probably not very much higher than the elephants of the present time, but was stoughter, more clumsy, and heavier. It is thought they were overwhelmed by some sudden catastrophe during some portion of the long drift, accompanied by a depression of temperature, and probably by a subsidence of the land and an invasion of the sea, general over the northern regions of both hemispheres; during the preceding tertiary epoch, there was an elevation of temperature, permitting tropical animals to go far to the north. This temperature became colder, the animals becoming adapted for it, as shown by their external covering, until they suddenly become extinct during the glacial period of the drift.

Prof. Rogers, on Feb. 1, 1854, in the proceedings of the Boston Society of Natural History, drew attention to the fact that while the European Mammoth is found in the drift stratum the North American fossil elephant or Mammoth is imbedded in strata above the drift, of a distinctly more recent age, and was a contemporary of the *Mastodon Gigantes*, their bones being found to-

gether in the long period of surface tranquility which succeeded the strewing of the general drift, and were overtaken and exterminated together, and by the same changes, partly of climate, partly of a second but more local displacement of the waters which re-shifted the drift, and formed the later lake and river terraces. In the pliocene deposits of Kansas, Dr. Hayden found bones of the Mastodon and Mammoth. Their remains have been found in Texas, Mexico, Spanish America, and even as far as the Arctic circle.

The best description of the Mastodon may be found in the great work of the late Dr. John C. Warren, of Boston, assisted by J. F. W. Lane: "*The Mastodon Giganteus of North America.*"

Dr. Warren describes thirty different species of the Mastodon His work is the most complete ever written on the subject, and to it I would refer those who wish to obtain a complete history of the different species and their anatomical relations. It would consume too much space, in a paper like this, to enter into a detailed description of the anatomy of these animals.

The finest of the skeletons of this specie, is the one described by Dr. Warren, in the work above mentioned. It was discovered at Newburg, N. Y., in 1845, in a swamp usually covered with water, but left dry during the summer. It is now in the city of Boston. This animal was about twelve feet high and twenty-five feet in length, measuring from the end of the upper jaw to the end of the tail, or seventeen feet from the end of the upper jaw to the root of the tail; its girth around the ribs was sixteen or seventeen feet; it had the vaulted and cellular skull of the elephant, with large tusks in the upper jaw; its tusks were about eleven feet long, of which eight feet and eight inches projected beyond the socket. From the character of the nasal bones and the shortness of the head and neck, it has been concluded that it had a trunk; it had, like the elephant, twenty ribs, the longest of which was fifty-four and three-quarter inches. The pelvis measured six feet and two inches across the anterior superior spinous processes; the fore foot measured nearly two feet across; all the bones of the limbs are very massive and heavy. The grinding surface and number of teeth differ from the Mammoth and Elephant.

A few remains of the Mastodon had been discovered in North

America as early as 1705, but it was not until 1801 that anything like a complete skeleton was obtained, when a tolerably complete one was procured from the marshes of Orange County, N. Y. This was carried to London in 1802, but was soon returned to this country, where it occupied a prominent place in Peale's Museum, at Philadelphia, until 1849 or 1850, when it suddenly disappeared. It was imperfect, wanting a considerable part of the head, some vertebrae ribs, and bones of the limbs. It was believed, by Dr. Warren, to have fallen into the possession of Prof. Kaup, of Darmstadt, Germany.

Another skeleton, less perfect than the last, obtained about the same time, was exhibited in Baltimore for years, and, in a dismounted state, came into possession of Dr. Warren, of Boston, in 1848.

In 1840, Mr. Koch procured a rich collection of Mastodon bones from the banks of the Missouri, and put together a nondescript animal, the so-called *Missourium*, which drew large crowds of visitors in this country and from Europe.

Sir Charles Lyell, in his Elementary Geology, says in 1845 that no less than six skeletons of the same species of Mastodon were found in Warren county, N. J., six feet below the surface, by a farmer who was digging out the rich mud from a small pond which he had drained.* Five of these skeletons were lying together, and a large part of the bones crumbled to pieces as soon as they were exposed to the air. But nearly the whole of the other skeletons, which lay about ten feet apart from the rest, was preserved entire.

This skeleton, I believe, is in Cambridge, Massachusetts. Sir Charles Lyell says, "From the clay in the interior, within the ribs just where the contents of the stomach might naturally have been looked for, seven bushels of vegetable matter were extracted. He submitted some of this matter to Mr. A. Henry, of London, for microscopic examination, and he informed him that it consisted of pieces of small twigs of a coniferous of the Cypress family, probably the young shoots of the White Cedar, still a native of North America, on which we may conclude this extinct Mastodon once fed.

*From other authorities I learn that these skeletons were found in 1844.

We have the history of the bones, skull and tusks of the Mastodon that were found in or under a pond that had been drained in Geneseo, in the State of New York, north west of us. I recollect of seeing a very fine skeleton of the Mastodon in a museum in Albany some years since. I think it was quite complete in its parts. I have not had time to learn its history.

I was lately informed by Ex-Sheriff Guy Tozer, that when he was digging the Wabash & Erie Canal, in Indiana, in 1834, about fifteen miles south of Fort Wayne, his men exhumed the bones of a very large Mastodon. It lay about eight feet below the surface. He says the bones and teeth were in a very good state of preservation and that the largest ribs measured over six feet in length ; the teeth were very large. He does not know that the bones were preserved, but thinks that a gentleman living near took some of the teeth with the intention of sending them to Philadelphia,

From the foregoing remarks, it is evident that the Mammoth and the Mastodon were quite numerous on this continent, and their fossil remains, found in the north of Europe, is proof that they abounded there in numbers almost equal to the buffalo that now roam in our western prairies. As they are found only as fossils, the mind naturally inquires, in what age did they live, and what was the cause of their becoming extinct ?

If we answer in a geological sense, we shall say they lived in a recent period ; but, if we compute the time in years, they have been many. We can not say how many years have come and gone since the last member of this gigantic race passed away, but we can give the geological period in which they lived.

But, before entering upon the geological history, as a matter of curiosity, I will give the traditions of the Indians of this country, as related by Mr. Jefferson, which may be found in Morse's Geography, a work written many years since. He says Mr. Jefferson informs us that a late Governor of Virginia, having asked some delegates of the Delawares what they knew or had heard respecting this animal, (the Mammoth), the chief speaker immediately put himself into an oratorial attitude, and, with a pomp suited to the supposed elevation of his subject, informed him that it was a tradition, handed down from their fathers, " That, in ancient times, a herd of them came to the Big Bone Licks, and be-

gan a universal destruction of the bears, deer, elks, buffalos, and other animals which had been created for the use of the Indians; that the Great Man above, looking down and seeing this, was so enraged, that he seized his lightning, descended to the earth, seated himself upon a neighboring mountain, on a rock, on which his seat and the print of his feet are still to be seen, and hurled his bolts among them till the whole were slaughtered, except one big bull, who, presenting his forehead to the shafts, shook them off as they fell; but at length, missing one, it wounded him in the side; whereupon springing round, he bounded over the Ohio, the Wabash, the Illinois, and finally over the great lakes, where he is living at this day."

Before speaking of the age in which the Mastodon and Mammoth lived, we may be better understood by referring to the physical changes the earth has undergone from time to time, and in a general way of the succession of animals that preceded them.

It is very evident, and admitted by geologists, that the earth was once in a molten state, and gradually cooled by radiation until the solid crust was formed. This crust, or shell, was composed of materials which are bad conductors of heat, arrested further escape of the latter, and thus to the present day a high temperature has been preserved to the central mass.

Wonderful changes have taken place in this primeval crust. Its surface has been remodeled again and again, mountains have been submerged beneath oceans, and the beds of the latter upheaved into Alpine ranges; and, by these successive transformations, it has gradually been perfected and adapted to its final use. During all these revolutions, the changes in the condition of the earth have been attended with corresponding changes in plants and animals, and their organic remains, imbedded in the rocks, are the records of these transformations. The igneous and metamorphic rocks, destitute as they are of fossils, tell but little of the lapse of time in the construction of the earth, but the successive chapters of its history before the creation of man.

The fossiliferous rocks are classed under three great divisions, called periods, corresponding with the order of time in which their formation occurred, viz., the primary, secondary, and tertiary periods. These, though subdivided into subordinary groups and

systems, possess types of life so obviously unlike as to make three great epochs of creation.

The Tertiary period is divided into the Eocene, Miocene, Pliocene, and to these may be added the post Planorbis or later period, and the still later, the recent period, or that which has elapsed since the creation of man.

The Primary Period is the oldest fossiliferous strata in which are found Corals, Crustacaes, Molmusks, Fishes, and a few reptiles. It is distinguished from all other eras by extraordinary vegetation, for, from the Arctic to the Antarctic zone, the earth was exceedingly prolific, and trees of rank and luxurious growth overspread its surface. Lofty forests of trees, and beautiful, tree-like ferns, tall calamites, and graceful palms cast their shadows upon the teeming soil, and mingled with a gigantic club moss, and the towering sigillaria, while lowlier plants of singular form and beauty, spread out their broad leaves to the light. Forests succeeded forests, untold centuries, and the dense and matted vegtation fell, layer upon layer, on the soil where it had grown, gradually changing into those vast beds of fuel which have been treasured up for the use of man. Dr. Buckland remarks, in speaking of the coal mines of Bohemia, that "The most elaborate imitations of living foliage upon the painted ceilings of the Italian palaces can not compare with the beauteous profusion of extinct vegetable forms which overhang the galleries of these mines. The roof is covered as with a canopy of gorgeous tapestry, enriched with festoons of graceful foliage, flung in wild, irregular profusion over every portion of its surface. The spectator feels himself transported, as if by enchantmeut, into the forests of another world, as he beholds the trees of forms and character now unknown upon the earth's surface, their scaly stems, bending branches, and delicate foliage but little impaired by the lapse of countless ages." During this period, the lower order of reptiles lived. Their foot prints have been found in coal fields of Europe, British America and in the United States. In several mines in Pennsylvania, large tracks have been found in the rocks in coal mines, and, from the impression being distinct, and cracks dividing the track in the rock, show conclusively that they were made while the clay was yet soft. Sir Charles Lyell says that in ten years, (between 1844

and 1854), the skeleton or bones of no less than seven carboniferous reptiles, referred to five genera, were brought to light, to say nothing of reptilian footprints, some of them too large to belong to the same species as the bones. It is the belief of geologists that, at the beginning of this period, the atmosphere was so heavily charged with carbonic acid gas that it was unfit for the respiration of the higher classes of animals, while it eminently contributed to the growth of plants whose food is carbon.

In the Secondary Period we find the existence of strange and enormous reptiles of the lizard kind. Such were the *Ichthyosaurus* and the *Plesiosaurus*, marine animals that abounded in that period. They were cold blooded, air breathing, carniverous monsters, with the head of a lizard and teeth of the crocodile. Their jaws were sometimes six feet in length, and contained more than two hundred teeth. The skeletons of this extinct race measure from five to thirty feet in length.

At the same period of the large marine animal just described, lived enormous land reptiles of a similar kind, such as the *Megalosaurus* and the *Ignanodon*. The *Ignanodon* was of great size, and its numerous bones which have been discovered show that it exceeded the elephant in bulk, and, like the latter, fed upon vegetables. Its proportions were great. In one case the circumference of the body was estimated at over fourteen feet, and the length of the animal seventy feet.

The *Megalosaurus* was a gigantic lizard, carniverous in its nature, and is computed to have attained a length of twenty-seven feet, and its body the enormous girth of over twenty-two feet.

Another extraordinary animal of this period was the *Pterydactyl* which somewhat resembled the bat, and yet was allied to the lizard. Its wings when extended, measured from tip to tip four feet. The noses of these animals were long like the crocodle, their eyes were of enormous size, enabling them to fly by night, and it is supposed they had the power of swimming.

During this period, birds of great size were on the earth, their tracks measured from eighteen to twenty inches in length, and their impressions remain to the present day.

It may be a wonder to many how it is that naturalists arrive with accuracy to the size of these extinct animals. It will be re-

membered that, in many instances, skeletons almost or quite entire have been found, and in other cases enough of the bones to enable a skilful comparative anatomist to tell, with great accuracy, the size of the animal, Sir Charles Lyell remarked that, to those who have never studied comparative anatomy, it may seem scarcely creditable, that a single bone taken from any part of the skeleton may enable a skilful ostoelogist to distinguish, in many cases, the genus, and sometimes the species of quadruped to which it belonged.

The Tertiary Period seems to be marked by the beginning of a new system of phenomena, very similar to those now in progress on the surface of our globe. The rocks and other formations are, to a great extent, like those which continue to be formed at the present day by the deposits of seas, rivers, and lakes, and the remains of animal and vegetable life approach nearer to the species now existing than the relics of the preceding ages.

The Saurian reptiles have passed away, and the beasts of the field, vast in size and countless in numbers, swarm over the earth. Its Mammoths and Mastodons, says Hugh Miller, its *Hippopotami*, its *Rhinoceri*, its enormous *Deionetherium* and collossal *Megatherium*, greatly more than equaled in bulk the largest mammals of the present time, and far exceeded them in numbers. We have already spoken of the Mammoth or fossil elephant as having been found far north, in Europe and in America, imbedded in ice and frozen gravel, and intimated that the climate must have been much warmer in the age in which these animals lived than at present, for they have been found as far north as the 72° of north latitude, which at the present time does not afford vegetation for their subsistence.

We have also said that in Europe they become extinct during the long drifts of the glacial period, and that the drift period in Europe preceded the drift in America, and it was evident that the Mammoth had lived on the Western Continent since the glacial period. This is evidence that the cold was not so great as to cause a universal destruction over the whole globe ; that in this country, Prof. Rogers believes that they were overtaken suddenly by the local displacement of the waters, which re-shifted the drift, and formed the latter lake and river terraces. Some have maintained

that they gradually became extinct by becoming mired in swamps and marshes, from time to time, which may be true to a small extent, as I have shown, that they have been found frequently in bogs and marshes, where they might naturally go and feed on the grasses found there, and thus be mired.

I will venture a suggestion that it is possible they were swept from the earth by some blighting pestilential disease, so poisonous in its character, that like the plague of old, all of this giant race fell within its influence.

I have but few more words to say in this hasty and very imperfect sketch of the Mammoth and Mastodon, and will close by giving the words of Sir Charles Lyell, before frequently quoted, relative to the number of years since these animals became extinct. He says, "I have shown that there is a fluviatile deposite in the valley of the Niagara, containing shells of the genera Melania, Lymnea, Planorbis, Valvate, Scyclas, Unio, Helix, &c., all of recent species, from which the bones of the great Mastodon have been taken in a very perfect state. Yet the whole excavation of the ravine, for many miles below the falls has been slowly effected since that fluviatile deposit was thrown down.

Whether or not, in assigning a period of more than thirty thousand years for the recession of the falls from Queenstown to their present site, I have over or under estimated the time required for that operation, but no one can doubt that a vast number of centuries must have elapsed before so great a series of geographical changes were brought about as have occurred since the entombment of this elephantine quadruped."